

REMARKS

The Office Action dated May 29, 2008 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1, 4-5, 9, and 13 have been amended to more particularly point out and distinctly claim the subject matter of the invention. Claims 2, 6, and 10 have been cancelled without prejudice or disclaimer. No new matter has been added and no new issues are raised which require further consideration or search. Therefore, claims 1, 3-5, 7-9, and 11-13 are currently pending in the application and are respectfully submitted for consideration.

The Office Action rejected claims 1-13 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,813,256 (“Nevo”) in view of U.S. Patent No. 6,987,780 (“Wei”), and further in view of U.S. Patent No. 7,356,146 (“Yi”). The Office Action took the position that Nevo discloses all the elements of the claims with the exception of certain elements. The Office Action then cited Wei and Yi as allegedly curing the deficiencies of Nevo. The rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 3-4 are dependent, recites a method, which includes transmitting packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side, and setting a

retransmission parameter so that the packet data units are not retransmitted to a first base station when receiving positive or negative status reports for the packet data units from said receiving side. The method further includes buffering the packet data units in a retransmission buffer, and receiving status reports for the packet data units from said receiving side. The method further includes purging from said retransmission buffer all the packet data units for which positive or negative status reports have been received, and scheduling remaining packet data units in said retransmission buffer for transmission to a second base station. The method further includes transmitting said scheduled remaining packet data units to said second base station.

Claim 5, upon which claims 7-8 are dependent, recites a system, which includes a network node connected at least to a first base station and a second base station, and user equipment connected to at least one of said first or said second base stations. The system further includes a transmitter configured to transmit packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side, and a retransmission buffer configured to buffer the packet data units. The system further includes a setting device configured to set a retransmission parameter so that the packet data units are not retransmitted to said first base station when receiving positive or negative status reports for the packet data units from said receiving side, and a receiver configured to receive the status reports for the packet data units from said receiving side. The system further includes a management

device configured to purge from said retransmission buffer the packet data units for which positive or negative status reports have not been received and to schedule remaining packet data units in said retransmission buffer for transmission to said second base station. The transmitter is configured to transmit said scheduled packet data units to said second base station.

Claim 9, upon which claims 11-12 are dependent, recites an apparatus, which includes a transmitter configured to transmit packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side, and a retransmission buffer configured to buffer the packet data units. The apparatus further includes a setting device configured to set a retransmission parameter so that the packet data units are not retransmitted to said first base station when receiving positive or negative status reports for the packet data units from said receiving side, and a receiver configured to receive the status reports for the packet data units from said receiving side. The apparatus further includes a management device configured to purge from said retransmission buffer the packet data units for which positive or negative status reports have not been received and to schedule remaining packet data units in said retransmission buffer for transmission to said second base station. The transmitter is configured to transmit said scheduled packet data units to said second base station.

Claim 13 recites an apparatus, which includes transmitting means for transmitting packet data units for unacknowledged mode services in a handover between base stations

in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side, and setting means for setting a retransmission parameter so that the packet data units are not retransmitted to said first base station when receiving positive or negative status reports for the packet data units from said receiving side. The apparatus further includes buffering means for buffering the packet data units in a retransmission buffer, and receiving means for receiving status reports for the packet data units from said receiving side. The apparatus further includes purging means for purging from said retransmission buffer all the packet data units for which positive or negative status reports have been received, and scheduling means for scheduling remaining packet data units and said retransmission buffer for transmission to said second base station. The apparatus further includes transmitting means for transmitting said scheduled remaining packet data units to said second base station.

Thus, according to embodiments of the invention, users of streaming services experience less transmission disruptions during a handover procedure. At the same time, unnecessary packet data unit retransmissions to the original base station are avoided by using a special configuration of an acknowledged mode RLC.

As will be discussed below, the combination of Nevo, Wei, and Yi fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the advantages and features discussed above.

Nevo generally discloses a method for conveying signaling between a mobile station and a base station via a CDMA air interface in a GSM mobile wireless

telecommunications system. The method includes generating a signaling message based on a GSM interface standard. Data link services are provided to process the message for transmission over the CDMA air interface, and the processed message is then transmitted over the CDMA air interface. Preferably, the data link services are provided by a data link layer, which produces an IS-95 message for transmission. (see Nevo at Abstract).

Wei generally discloses techniques for retransmitting data via RLP in a CDMA system with a first retransmission mechanism provided by the RLP and a second retransmission mechanism provided by an HARQ-CF. In one method, missing RLP frames are first detected. A dynamic timer is then maintained for each RLP frame detected to be missing. The dynamic timers are event-driven and have variable time durations. Each dynamic timer is updated based on events known to the receiver HARQ-CF. Fixed timers with fixed time durations may also be maintained for the missing RLP frames. Whether or not a missing RLP frame is lost is determined based on the dynamic timer and the fixed timer (if any) maintained for the RLP frame. A NAK is potentially issued for retransmission of each RLP frame deemed to be lost. (see Wei at Abstract).

Yi generally discloses a system and method for performing SRNS relocation. The method includes transmitting radio resource information including a ciphering parameter from a source RNC to a target RNC, and modifying the ciphering parameter to coincide with a deciphering parameter which a user terminal uses when out-of-sequence data is received. The method further includes ciphering a data unit based on the modified

ciphering parameter, and transmitting the ciphered data unit from the target RNC to the user terminal. (see Yi at Abstract).

Applicants respectfully submit that Nevo, Wei, and Yi, whether considered individually or in combination, fail to disclose, teach, or suggest, all of the elements of the present claims. For example, the combination of Nevo, Wei, and Yi fails to disclose, teach, or suggest, at least:

- *“transmitting packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side,”* as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13;
- *“setting a retransmission parameter so that the packet data units are not retransmitted to a first base station when receiving positive or negative status reports for the packet data units from said receiving side,”* as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13;
- *“buffering the packet data units in a retransmission buffer,”* as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13;
- *“receiving status reports for the packet data units from said receiving side,”* as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13;

- “*purging from said retransmission buffer all the packet data units for which positive or negative status reports have been received,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13;
- “*scheduling remaining packet data units in said retransmission buffer for transmission to a second base station,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13; and
- “*transmitting said scheduled remaining packet data units to said second base station,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13.

With respect to “*transmitting packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side,*” as recited in claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 12, lines 5-15 in Nevo as disclosing said claim element. (see Office Action at page 2). However, the paragraph in Nevo cited by the Office Action discloses that a GSM-CDMA data link layer 54 of the hybrid GSM/CDMA cellular communications system suspends acknowledged mode messages from a mobile station 40 to a base station subsystem 32 during a hard handover to another base station subsystem, so as to avoid message loss. Specifically, upon initiation of a handover, the base station subsystem 32 suspends the flow of radio interface layer messages to and from the mobile station 40. (see Nevo at col. 12, lines 5-11). However, Nevo is silent as

to the transmission of unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode. In contrast, independent claim 1 of the present application recites “transmitting packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving side.” The other independent claims include similar recitations.

Applicants respectfully submit that, in general, it is not practical to send unacknowledged data (such as streaming data) in an acknowledged mode since the acknowledgements cause problems for the playback of the streaming data. However, embodiments of the present invention use an acknowledged mode for transmission in a handover situation when transmitting packet data units for unacknowledged mode services. Furthermore, Nevo is directed only towards the hard handover, and solves the message loss problem by a suspension of the messages, which is a different situation than embodiments of the present invention.

With respect to “*setting a retransmission parameter so that the packet data units are not retransmitted to a first base station when receiving positive or negative status reports for the packet data units from said receiving side,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 9, lines 8-22 in Nevo as disclosing said claim element. (see Office Action at page 2). The paragraph in Nevo cited by the Office Action discloses that the

GSM-CDMA data link layer 54 provides orderly fragmentation of long radio interface layer messages, so that only the lost data link layer fragments must be retransmitted. The paragraph further discloses that if transmission of the data link layer fragments of a long radio interface layer message is preempted, the GSM-CDMA data link layer resumes transmission of only the fragments that were not transmitted before the preemption. (see Nevo at col. 9, lines 13-22). Applicants respectfully submit that the cited paragraph does not teach anything about setting a retransmission parameter value as recited in independent claim 1, and similarly recited in the other independent claims. Instead, the cited paragraph of Nevo merely states that instead of retransmitting a whole frame, only lost fragments of a frame are retransmitted. Applicants further submit that, in a normal situation, if the retransmission parameter was not set at all, a retransmission would occur after a negative status report. Thus, according to embodiments of the present invention, after setting the retransmission parameter, there are no retransmissions at all.

With respect to “*buffering the packet data units in a retransmission buffer*,” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 12, lines 23-30 in Nevo as disclosing said claim element. (see Office Action at page 2). The paragraph in Nevo cited by the Office Action discloses handling the messages from a IS-95 physical layer by placing them into a reception queue, and further into an ordering buffer. (see Nevo at col. 12, lines 20-30). However, independent claim 1 requires buffering in a retransmission buffer. The other independent claims also recite a “retransmission buffer.” In Nevo, the buffered messages

are not subsequently transmitted. Instead, the messages are decapsulated and sorted into concatenation buffers for further operations.

With respect to *“receiving status reports for the packet data units from said receiving side,”* as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 12, lines 47-61 in Nevo as disclosing said claim element. (see Office Action at page 2). In the aforementioned paragraph, Nevo discloses the reassembly of the fragments of a message which are held in a specifically assigned buffer until the message is fully assembled. Subsequently, they are passed to a queue. (see Nevo at col. 12, lines 47-61). Applicants respectfully submit that the cited paragraph of Nevo does not disclose receiving status reports for the packet data units from the receiving side.

With respect to *“purging from said retransmission buffer all the packet data units for which positive or negative status reports have been received,” “scheduling remaining packet data units in said retransmission buffer for transmission to a second base station,”* and *“transmitting said scheduled remaining packet data units to said second base station,”* as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action correctly concludes that Nevo fails to disclose or suggest these claim elements.

Furthermore, Wei and Yi, whether considered individually or in combination, do not cure the deficiencies of Nevo.

With respect to “*purging from said retransmission buffer all the packet data units for which positive or negative status reports have been received,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 16, lines 39-45 in Wei as disclosing said claim element. (see Office Action at page 3). The paragraph in Wei cited by the Office Action discloses that a receiver purges all subpackets that have been received for an encoder packet and starts a decoding process anew. The paragraph further discloses that this autonomous transmitter HARQ-CF retransmission scheme allows a lost encoder packet to be retransmitted without waiting for a delayed NAK from a receiver RLP. (see Wei at col. 16, lines 39-45).

Applicants respectfully submit that, according to embodiments of the invention, packets data units are purged based on received status reports. The status reports may include either a positive or negative acknowledgement. In either case, there are no retransmissions. Furthermore, independent claim 1 recites “setting ... when receiving positive or negative status reports for the packet data units from said receiving side,” and “purging from said retransmission buffer all the packet data units for which positive or negative status reports have been received.” The other independent claims include similar recitations. Thus, unlike a normal situation where a retransmission occurs when a negative status report is received, the retransmission is prevented according to embodiments of the invention.

In Wei, only packets that have been properly received by the receiver (i.e. where an ACK is received) are purged. In fact, Wei discloses that a lost encoder packet is automatically retransmitted without waiting for a delayed NAK from the receiver RLP. (see Wei at col. 16, lines 41-45). There is no disclosure in Wei of purging packets where a negative status reports have been received, because Wei specifically discloses that all subpackets which have been received are purged. (see Wei at col. 16, lines 39-41).

With respect to “*scheduling remaining packet data units in said retransmission buffer for transmission to a second base station,*” and “*transmitting said scheduled remaining packet data units to said second base station,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 16, lines 39-45 in Wei as disclosing said claim elements. (see Office Action at page 3). The paragraph in Wei discloses improving the reliability of data transmission by means of retransmission of a lost encoder packet without waiting for a NAK from the receiver. (see Wei at col. 16, lines 39-45). However, independent claim 1 recites transmitting ... to said second base station.” Independent claims 5, 9, and 13 include similar recitations. Wei fails to disclose, or suggest, a second base station, let alone transmitting to a second base station.

Moving from the cited prior art reference of Wei, to the cited prior art reference Yi, with respect to “*transmitting packet data units for unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode radio link control entity between a transmitting side and a receiving*

side,” as recited in claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 14, lines 21-31 in Yi as disclosing said claim element. (see Office Action at page 3). However, similar to how Nevo is silent as to the transmission of unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode, as discussed above, Yi also fails to disclose transmitting unacknowledged mode services in a handover between base stations in a mobile communications network in an acknowledged mode.

Finally, with respect to “*purging from said retransmission buffer the packet data units for which positive or negative status reports have not been received,*” as recited in independent claim 1, and similarly recited in independent claims 5, 9, and 13, the Office Action cited the paragraph at col. 4, lines 31-36 and 44-50 in Yi as disclosing said claim element. (see Office Action at page 3). The cited paragraph discloses retransmitting unsuccessfully transmitted PDUs based on the status report received from the receiver, while working in the acknowledged mode. While one of ordinary skill in the art might be able to infer from the disclosure of Yi that purging is performed if a positive acknowledgement report is received, the independent claims recite purging being performed when a positive acknowledgement report or a negative acknowledgement report is received. Like Nevo, Yi is silent as to purging a PDU when a negative acknowledgement report is received.

Therefore, for at least the reasons discussed above, the combination of Nevo, Wei, and Yi fails to disclose, teach, or suggest, all of the elements of independent claims 1, 5,

9, and 13. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

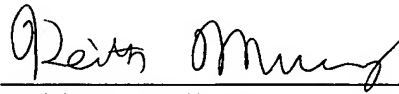
Claims 3-4, 7-8, and 11-12 depend upon independent claims 1, 5, and 9, respectively. Thus, Applicants respectfully submit that claims 3-4, 7-8, and 11-12 should be allowed for at least their dependence upon independent claims 1, 5, and 9, respectively, and for the specific elements recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art references fails to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1, 3-5, 7-9, and 11-13 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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